IS 11264 (1985): Code of practice for manufacture of safety rubber footwear for miners [CHD 19: Footwear]

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Indian Standard

CODE OF PRACTICE FOR MANUFACTURE OF SAFETY RUBBER CANVAS FOOTWEAR FOR MINERS

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 January 1985, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

0.2 This code of practice has been prepared in order to assist the manufacturers to overcome the practical difficulties faced by them to manufacture safety rubber canvas boots for miners conforming to IS : 3976-1982*. It will also help in assisting the purchasing authorities in getting boots of acceptable quality.

0.3 This standard is expected to provide adequate information on manufacturing technique and related details. The material requirements and constructional details are covered in IS : 3976-1982*, which is a necessary adjunct to this standard.

1. SCOPE

1.1 This standard recommends code of practice for the manufacture of safety rubber canvas footwear for miners.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2050-1967† shall apply.

3. GUIDELINES FOR MANUFACTURE

3.1 Shape and Design — The footwear shall be made to the pattern, shape and design as given in IS : 3976-1982* for Type 1 and Type 2. Standard pattern of typical component, for Type 2 boots, size 8, are given in

*Specification for safety rubber canvas boots for miners (*second revision*).
†Glossary of footwear terms.

Fig. 1 for the guidance of manufacturers. For Type 1, manufacturers should follow standard pattern to suit the last conforming to IS : 7329 1974*.

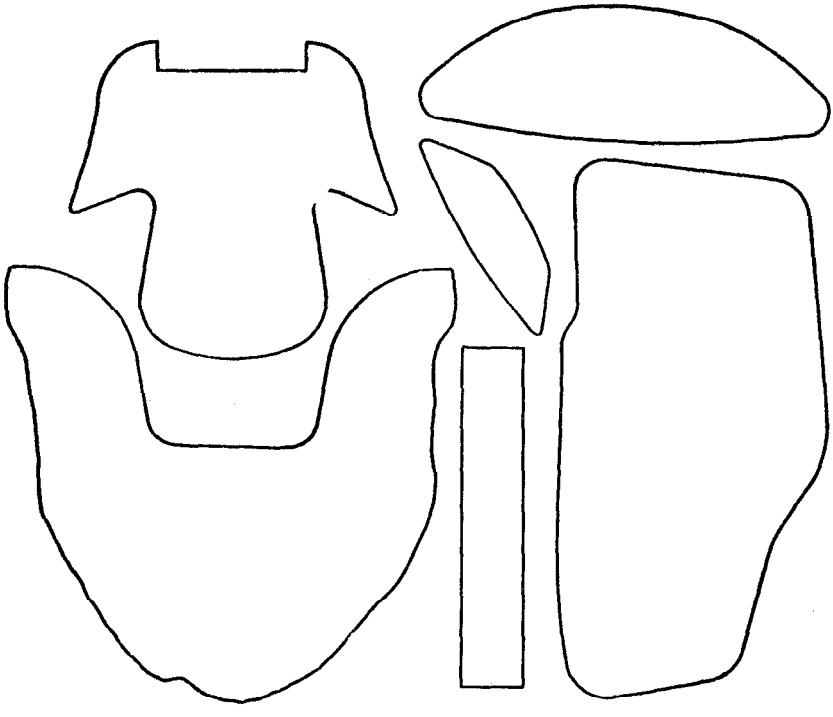


FIG. 1 STANDARD PATTERN OF FOOTWEAR TYPE 2 (SIZE NO. 8)

3.1.1 Large vamp gets premature wrinkles/creases, therefore, short vamp used in Type 2 should not be elongated. Additional tape stitching at the vamp and quarter joints shall ensure better strength.

3.1.2 Correct insole grading according to Fig. 2 is essential, which should be in alignment with the prescribed lasts conforming to IS : 7329-1974*.

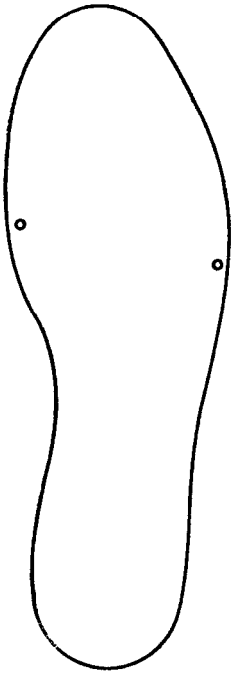
3.2 Material — The mandatory and recommendatory requirements of various raw materials are prescribed in Table 1.

*Specification for metal lasts for safety rubber-canvas boots for miners.

TABLE 1 CRITICAL REQUIREMENTS OF RAW MATERIALS

Sl No.	Material	Mandatory		Recommendatory
		Characteristic	Requirements	
(1)	(2)	(3)	(4)	(5)
i)	Dyed cotton fabric, waterproofed (IS : 2422-1979*)	Mass, g/m²	375 ± 52·5	Other requirements of IS : 2422-1979*
	—	Breaking strength N, *Min*:		
		Warp	1 000·0	
		Weft	900·0	
ii)	Cotton fabric drill (IS : 177-1977†)	Ends/cm	38 ± 5	Other requirements of IS : 177-1977†
		Picks/cm	19 ± 5	
		Breaking strength, N, *Min*:		
		Warp	1 075·0	
		Weft	625·0	
iii)	Binding material (IS : 1895-1982‡)	Width, mm	13 ± 2	Other requirements of IS : 1895-1982‡
		Breaking strength on 50 cm test length average, N, *Min*	355·0	
iv)	Thread for upper (IS : 1720-1978§)	Breaking strength, N, *Min*:		Other requirements of IS : 1720-1978§
		145 d tex × 6 (Variety No. 29)	21·1	
		(500 d. tex × 3) (Variety No. 8)	27·0	
v)	Steel toe cap (IS : 5852-1977‖)	Thickness, mm	1·6 ± 0·2	Other requirements of IS : 5852-1977‖
		Impact value, mm, *Min*	13·5	
vi)	Fabric lace (IS : 4778-1968¶)	Length, cm	115 ± 10	Other requirements of IS : 4778-1968¶
		Breaking strength, N/ *Min*	450 between 18 cm grips at 300 mm/ min	
vii)	Individual rubber components, physical requirements (IS : 3976-1982**)	Table 1 of IS : 3976-1982**	Table 1 of IS : 3976-1982**	Other requirements of IS : 3976-1982**
viii)	Individual components (material and thickness) of footwear (IS : 3976-1982**)	Sl i) to xii) of Table 2 of IS : 3976-1982**	Sl i) to xii) of Table 2 of IS : 3976-1982**	Other requirements of IS : 3976-1982**

*Specification for dyed cotton fabric, waterproofed (*first revision*).
†Specification for cotton drills (*third revision*).
‡Specification for cotton tape *NEWAR*, grey or dyed (*first revision*).
§Specification for cotton sewing threads (*second revision*).
‖Specification for protective steel toe caps for footwear (*first revision*).
¶Specification for cotton laces for footwear.
**Specification for safety rubber canvas boots for miners (*second revision*).



Size No. of Insole	Length, Girth of Ball (in mm)
4	224
5	230
6	236
7	242
8	248
9	254
10	260
11	266
12	272

FIG. 2 INSOLE PATTERN

3.3 Manufacture — Last of correct size and fitting should be used as prescribed in IS : 7329-1974* along with graded insole. The cross-sectional details given at Fig. 1 (for Type 1) and Fig. 2 (for Type 2) of IS: 3976-1982† where due to incorporation of several components and dimension of steel toe cap of outer sole is required to be adjusted suitably. While making moulds for outer sole, due care should be taken to increase outer dimension at the toe and seat portion suitably, so that unit sole fit without any protrusion or depression at the edges. Improper sole moulds will result into air pockets and unreliable adhesion of foxing. Steel toe cap should be hammered at the edges so that it may exactly fit to the contour of last. Blown rubber sheet should be inserted beyond the steel toe cap to avoid rupture of canvas upper by the sharp edge of steel toe cap. Lasting margin of about 12 mm should be cemented all round. After pulling canvas upper over the last, remove all wrinkles by trimming; otherwise, there is every possibility of poor adhesion of sole. Sufficient pressing either by air-bed apparatus or by hammering on all cemented portion, is needed. Serrated wheel marks at all joints shall ensure better bonding. The concealed foxing should also be marked with serrated wheel. During vulcanization, adequate air pressure should be injected indirectly into vulcanizer as soon as possible and prior to sufficient heat for vulcanization, which will ensure better vulcanization without developing air pocket.

3.4 Critical Requirements in Manufacture

a) All the requirements in Tables 1 and 2 of IS : 3976-1982†,

b) Adhesion of quarter foxing in Type 1 and Type 2,

c) Use of correct pattern and insole (*see* Fig. 1 and 2),

d) Edges of sole should not get depressed or protrude at the surrounded foxing,

e) The eyelets shall not show any sign of damage or distortion after the clenching operation,

f) Fixing of steel toe cap. (*see* 1A and 2A in Fig. 1 and 2 of IS : 3976-1982†),

g) Steel toe cap should not bulge out after fixing at the toe of the safety footwear,

h) Lasting margin of about 12 mm $\pm$1 mm,

j) There shall not be any air pocket at surrounded foxing, and

k) Each pair should be inspected after manufacturing and finishing.

*Specification for metal lasts for safety rubber canvas boois.
†Specification for safety rubber canvas boots for miners (*second revision*)

3.5 Specific Care — Specific care shall be taken at the time of fabrication for following particulars.

3.5.1 *Size (Length) Grade* — As shown in Fig. 2

3.5.2 *Leg Height* — The total leg height of the boots for size 8 shall be 95±1·5 mm increased/reduced by 1·5 mm for each successive bigger/smaller size, as the case may be.

3.5.3 *Mass* — 1 550 g *Max* for Type 1 and 1 400 g *Max* for Type 2. However, in case of type 2, additional tolerances of 50 g for size 10, and of 100 g for size 11 and 12 are acceptable.

3.5.3 *Impact Test* — 13·5 mm or more at the moment of maximum depression.

3.6 Finishing — Each of the footwear shall be provided with fabric laces (*see* **4.6** of IS : 3976-1982*), either matching the shade of upper or black. Sulphur dyes shall not be used in dyeing them.

3.7 Physical requirements of individual rubber components shall be checked prior to incorporation. Material and thickness requirements of individual components shall also be checked prior to manufacture of footwear.

3.8 Rags (White or Black) — shall be checked visually and rotten rags in worn out condition shall be avoided.

*Specification for safety rubber canvas boots for miners (*second revision*).